THE

VETERINARY JOURNAL

Editor :
FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor :
GLADSTONE MAYALL M.R.C.V.S.

NOVEMBER, 1917.

Editorial.

THE VALUE OF A PROFESSIONAL PRESS.

THAT the Press should be censored is very necessary, and no one now denies that what was considered irksome in this direction at the commencement of the war has become a grim necessity.

That the professional Press should have its share in this is also wise, and we in our profession, whose mission is to deal with large bodies of horses, bow down willingly to the law.

To carry on at all is something under the present conditions, and that we are able still to present articles of original research and clinical value speaks well for the enthusiasm of our contributors and readers.

In fact, we may almost venture to state that the war has " bucked up " our contributors, instead of diminishing either their numbers or the value of their contributions. Original articles figure largely in our columns, and quite a number of diseases unknown to practitioners in Great Britain have been described and worked upon since the war area was entered. Take, for example, the ravages of the Preisz-Nocard bacillus, giving rise to Ulcerative Lymphangitis or Ulcerative Cellulitis, as it has also been termed; take Epizootic Lymphangitis, Stomatitis, Ulcerative Necrosis, the part played by forage acari, to say nothing of the proof given that it is possible now-a-days to keep a huge army free from Glanders by the Mallein test.

Surgery, again, has its chance, and many new operations are being described and regularly practised. It is indeed the opportunity for the keen, observant veterinarian, an opportunity such as will probably never occur again, and we are all grateful to observe that it is not being neglected.

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The value of all this is, however, increased a thousandfold by the fact that the publication of our professional journals still continues, and for this we of the profession have much to thank the publishers and those who attend to the financial side.

Professional journalism never was a paying game, especially in a small profession like ours, and that our publishers stand by us and still allow their publications to appear—and that without a grumble, too—speaks volumes for them and adds another link to the chain which binds together the lay portion and the professional.

If only our contributors will continue to play their part, and send articles of the same quality as come in at present, we need have no fear that the value of the continuation of our professional Press will be more than a thousandfold repaid to ourselves and to the generations who will have to follow us.

Original Communications.

REPORT ON ULCERATIVE CELLULITIS—ULCEROUS LYMPHANGITIS.

By Captain E. A. Watson, C.A.V.C.

The A.V.C. Bacteriological Laboratory, B.E.F.

Introduction.

The term "Ulcerative Cellulitis" is officially used in the British Army Veterinary Service in France to designate a characteristic type of progressive inflammation and suppuration producing purulent ulcerous lesions on the limbs of horses, and is regarded as contagious in nature and inclined to rapidly spread where horses are congregated in large numbers. I have already indicated, in a preliminary note on this subject, that "Ulcerative Cellulitis" is a form of the disease better known as the Ulcerous Lymphangitis of Nocard (La Lymphangite Ulcereuse). This view is fully confirmed by my further investigations, and it may be clearly stated as such without the slightest hesitation, for the etiological factor in the disease is the bacillus of Preisz-Nocard. This fact is thoroughly established on the clearest bacteriological evidence.

There has been, and still is, in some quarters, a tendency to regard "Ulcerative Cellulitis" as a specific infection distinct from Ulcerous Lymphangitis. Such a view and differentiation seems to have arisen when the disease first appeared among the army horses, partly through a misconception of the anatomical changes in, and the symptomatology of, Ulcerous Lymphangitis, and the different forms of disease caused by varieties of the Preisz-Nocard bacillus.

There is a mistaken idea that in Ulcerous Lymphangitis the lymph

glands are mainly involved, that they become swollen, indurated, and suppurate. This is an erroneous conception, and it needs only a reference to the standard work of Hutyra and Marck to point it out. It is stated there, clearly, that—

> "Ulcerative lymphangitis is a chronic contagious disease of horses, in the course of which, usually without involving the regional lymph glands, there developes . . . . . The lymph glands in the regions of the ulcerous processes may occasionally undergo moderate swelling, but as a rule there is no induration, while suppuration never occurs."

Further, particular stress is laid upon these points, in the same work, in differentiating the disease from cutaneous glanders and epizootic lymphangitis, in either of which the lymph glands are extensively involved.

It is unfortunate, therefore, that these important points which exactly apply to Ulcerative Cellulitis should have been disregarded or wrongly used to differentiate identical conditions.

A tendency to regard Ulcerative Cellulitis as exclusively a localised, and Ulcerative Lymphangitis as a rapidly generalised infection has also led to confusion.

The fact is that we are dealing with but one disease, but one in which the causative organism—the bacillus of Preisz-Nocard—varies greatly in virulence, toxin production, etc., consequently, and in conjunction with different modes of infection, various types or forms of the disease are set up, as we shall see further on. Just as different strains of the bacillus of glanders and of the bacillus of tuberculosis set up different types of disease in the same and in different species of animals, so does the bacillus of Preisz-Nocard.

Finally, it is probable that many causes of simple wound infections and abscesses arising from punctures of the skin—due to one or another of the varieties of pyogenic diplo-, staphylo- or streptococcus—are mistaken for Ulcerative Cellulitis. Such infections may and do not infrequently occur in the disease under discussion, but then they are secondary and not the causative factors.

It is of no consequence whether we call the disease Ulcerative Cellulitis or Ulcerous Lymphangitis, and draw arbitrary lines of distinction in the different forms and stages of the disease, but it is important in the control and suppression of it to recognise their co-relationship, common origin and cause.

The importance of this disease is well understood, both from a military and an economic point of view, from the large number of animals affected and the heavy losses that have ensued as a result

of it, by death or destruction, or by animals becoming unfit for further military use.

Acknowledgments.—This investigation of the disease, called for by the Director of Veterinary Services, B.E.F., has been carried out mainly at No. 6 Veterinary Hospital, and the A.V.C. Bacteriological Laboratory, where I was enabled to make the detection and identity of the bacillus of Preisz-Nocard, and, through the facilities given by Major Kirby, D.S.O., in supplying animals and material for experiments, establish the specific relationship of that organism to the disease in question. No 19 Veterinary Hospital and the Indian Veterinary Hospital have also contributed by supplying material and carrying out experiments with the laboratory vaccines, reports on which have been handed in by Captains C. J. R. Lawrence, J. R. Greig and J. L. Clark.

Colonel A. C. Newsome, C.M.G., has directed and advised, and by timely suggestions and encouragement has contributed largely.

ULCERATIVE CELLULITIS—ULCEROUS LYMPHANGITIS.

(*Lymphangitis ulcerosa equorum.*)

Ulcerative cellulitis is a chronic infectious disease of horses and mules, characterised by a progressive development of abscesses and pus foci in the subcutaneous connective tissues, with a tendency to ulceration and usually without involving the large lymph vessels and regional lymph glands. It is caused by a variety of the bacillus of Preisz-Nocard.

Occurrence.—The disease is widely spread and prevalent among the Army horses in France. It occurs both in winter and in summer, and in horses that are well conditioned and cared for as well as among debilitated animals and those suffering from injuries, parasitic skin diseases and conditions of ill-health. The mud and rough conditions existing at the front predispose to and favour infection. Cases also develope in the Veterinary Hospitals, remount depôts, and wherever horses are congregated in large numbers.

Etiology.—Bacteriological evidence shows that an organism identical with the bacillus of Preisz-Nocard is the cause of the disease. This organism appears as a very short, delicate bacillus in separate particles, in pairs or in small masses. Frequently it is seen in a coccoid or oval form, and at first glance it is easy to mistake it for a micro or diplococcus. A familiarity with its cultural characteristics shows that in small masses it never grows in those regular grape-like clusters that are characteristic of staphylococci. Miscroscopic films show irregular clumps somewhat suggestive of certain forms of the diphtheria bacillus. Polymorphism is a pronounced characteristic.

The small coccoid or oval forms are most frequently seen in rapidly growing cultures; in aged cultures the bacillary form is apt to predominate, though many coccoid, swollen, pear and club-shaped or involution forms may be seen at the same time, in fact, all forms, typical and atypical, may occur in a single culture. The organism is non-motile, and does not form spores or capsules.

Staining.—The bacillus takes the ordinary aniline dyes readily. It stains sometimes unevenly, especially when a diluted stain is employed such as Carbol-fuchsin 1-20, the centre or middle being more lightly stained than the edges; in rapidly dividing organisms there may appear cross striations giving a more or less granular appearance. Both typical and atypical forms are Gram positive, staining intensely throughout.

CULTIVATION.

Liquid Media.—These are never turbid. There may be at first a slight cloudiness, but this is distinctly granular and the media soon clears by sedimentation. A granular growth develops at the bottom of the tube or flask, which on slight agitation breaks up into coarse granules. A greyish veil forms on the surface of ordinary bouillon if the culture rests undisturbed. This veil is not constant, but nearly so. Some strains form a very delicate and fragile veil, others a coarse and heavy one. On slight agitation the veil disintegrates and falls to the bottom. If a fragment be taken up on a platinum loop and passed quickly into a flame it crepitates and may fly off to quite a distance. By selection and subcultivation, a strain may be obtained that produces an abundant surface growth.

In bouillon-serum the veil does not form, but the deep growth is much more abundant than in ordinary bouillon.

In Martin's peptone broth there is no veil, the granules are coarse and heavy, and the media is always absolutely clear.

In glucose broth the organism does not grow well.

Solid Media.—On plain agar there is usually only a long delayed and scanty growth and with many strains none at all. On coagulated serum, serum-agar, blood-agar and potato-agar, the best growths are obtained. In 24 hours small round discrete colonies appear, greyish white, at first translucent, then opaque, with a waxy surface; on the 3rd or 4th day a papillate centre may be noted. On glycerine-agar there is no growth. In subcultures on favourable media, richly sown, a heavy white film covers the whole surface. Surface growths washed off in saline solution break up into granular masses which soon sediment. Prolonged grinding and shaking is necessary to obtain an even suspension, and even then the bacteria sediment down in a few hours.

Resistance.—In sealed agar tubes the organism remains alive for months and retains its virulence. In old bouillon cultures it may die out in the course of a month or two, owing probably to the development of toxins.

It is killed by heating at 60 deg. C. for half-an-hour, also after several hours contact with acetone, or with alcohol and ether in equal parts and then drying.

Pathogenecity.—The Preisz-Nocard bacillus is distinctly a pyogenic organism. Pure cultures injected subcutaneously produce a local suppuration and an abscess that comes to a head and ruptures in from 4-12 days, the wound healing in due course. When the inoculation is made under the skin of well-fleshed parts, such as the side of the neck or shoulder muscles, secondary abscesses and progressive inflammation rarely follow. When, however, the region of the fetlock or one of the fleshless tendinous parts of the extremities is the site of inoculation a typical abscess or bulla presents itself in from 3-5 days, ruptures, and discharges a creamy pus mixed with more or less blood and serum, becomes ulcerous, and heals tardily. Meanwhile, other typical lesions are developing, the infection progresses, and a clinical picture is presented identical with the "leg form" of Ulcerative Cellulitis.

A pure culture injected intraperitoneally into a male guinea pig produces a marked orchitis in about 4 days and death in 6 days or longer, depending upon the degree of virulence of the culture. Peritonitis and metastasis of the liver, spleen, and lymphatic ganglia are found on post-mortem examination.

Natural infection.—The appearance of the first visible lesion being in the majority of cases in one of the hind limbs in the region of the fetlock or between fetlock and hock suggests that the infecting organism gains an entry through a wound or abrasion, particularly such as is caused by the kick of a horse. Cracked heels, mud fever and any conditions in which the skin is broken favour the entry of the specific infection to the lymph spaces and subcutaneous connective tissues in which the disease first develops. However, many cases do occur in which there is not the slightest evidence of a wound or break in the continuity of the skin. Further, in the rarer forms of the disease—groups of small abscesses in the prescapular or precrural regions, one or two large isolated abcesses on the neck, back or loins, paranephritic abcesses, etc., in all of which a bacteriological examination reveals the Preisz-Nocard bacillus—the mode of infection cannot be explained.

Anatomical changes and Symptoms.—An abscess forms in the subcutaneous connective tissues. There is more or less diffuse swelling and tenderness. The abscess tends to rapidly come to a head in the

form of a soft node or bulla, ranging in size to that of a walnut, which ruptures and discharges pus. The character of the exudate varies. If pus is collected from a ripe abscess before the rupture, it is usually white and creamy. After the rupture the exudate contains more or less blood, and tends to become more and more viscid and serous, especially if the lesion involves a capsular ligament or tendon sheath. The lesion has now the appearance of an angry-looking ulcer with loose and bulging borders. The ulcers tend to dry up and heal, sometimes within ten days, more often in from 2-3 weeks. Meanwhile, fresh abscesses and ulcers are forming in the neighbouring tissues or at some little distance further up the limb, and the disease progresses until, after some months, there may be evidence of 15-20 or more lesions in the various stages of eruption and resolution, the older ones cicatrised, others dry, scabby or granular, and the recent ones discharging pus or sero-sanguineous fluid. Several ulcers may become confluent and give rise to sloughing. When the hock or other joint region is involved, there is thickening of a part and the exudate is usually more persistent and sero-purulent.

The course of the disease is irregular and obscured. It commences most frequently in the region of the fetlock and slowly ascends. It may not advance above the hock or it may extend up to the thigh to the inguinal and perineal regions, sometimes involving the scrotum and vulva. In some cases there does not appear any visible connection between abscesses in the inguinal region and ulcers on the fetlock or hock. On the other hand the disease may commence as a hock infection and extend above and below, or it may first appear as an abscess inside the thigh.

The " leg-form " of the disease may be regarded as typical. In one group of 200 leg cases, 178 were affected in the hind limbs (158 in one and 20 in both hind), 18 in the fore and 4 in hind and fore limbs. The disease is often marked by periods of tolerance and latency, followed by recrudescence. It frequently happens that horses are passed out as cured only to be readmitted some weeks or months later when the disease has become active again.

Lameness is not a constant symptom, depending upon the situation of the abscess. When the hock, fetlock, or a tendon is involved lameness is severe, but tends to disappear soon after the abscess has ruptured. In very chronic cases there is much thickening of the tendon sheaths and capsular ligaments; anchylosis may follow a joint infection, and elephantiasis of a limb is not a rare sequel.

An important characteristic of the disease is that it does not involve the regional lymph glands in suppuration or ulcerative inflammation. Even in cases more generalised than local the lymph nodes do not suppurate.

The rarer and atypical forms of the disease are manifested in (1) a group or groups of small abscesses in the precrural, prescapular, or pectoral regions, (2) one or more large isolated abscesses on the neck, back or loins (3) paranephritic abscesses of one or both kidneys, and (4) purulent foci in the lungs.

All of these diverse types have been met with among the animals under observation, and confirmed by bacteriological examinations. A strain of Preisz-Nocard bacilli obtained from a purulent kidney when inoculated subcutaneously on the side of the fetlock of a normal horse caused a typical leg-form of Ulcerative Cellulitis and proved to be very virulent.

Paranephritic abscesses have been frequently noted at post mortem examinations of horses destroyed or died on account of debility and emaciation and general ill-health. In a few of these cases, pus was collected and brought to the laboratory, and in each instance Preisz-Nocard infection was revealed by the cultural method of examination.

Diagnosis.—Chronic ulcerative cellulitis of a limb presents a sufficiently characteristic clinical picture for a diagnosis. It is differentiated from cutaneous glanders by the healing tendency of the ulcers and the absence of any noteworthy change in the regional lymph glands, which in both glanders and epizootic lymphangitis are indurated, swollen and contain pus foci. Further, the presence of the cryptococcus farciminosus in epizootic lymphangitis is easily ascertained.

The bacillus of Preisz-Nocard can be found in the pus of all cases of Ulcerative Cellulitis. When pus is drawn from a fresh and unopened abscess the organism is found pure and cultures are easily to be obtained in bouillon and on serum-agar. In the exudate of ulcerous lesions the bacillus may be associated with various species of diplo-, staphylo-, and streptococci.

However, the bacillus may be present only in very scanty numbers, and in such cases or where other organisms are present, the microscopical examination alone may not suffice, and it is then necessary to make cultures on serum-agar.

Atypical forms of the Disease, in each of which the diagnosis was established or confirmed by the detection and isolation in culture of the Bacillus of Preisz-Nocard (B.P.-N.).

It does not seem necessary to give a list and details of the findings of the B.P.-N. in the typical so called " leg-form " of Ulcerative Cellulitis cases, that is, where the lesions occur and the disease remains more or less localised in the regions below the hock or knee. It is sufficient to state that the bacillus was obtained from the pus collected from a great number of such cases, that cultures of the organism could always be obtained on serum-agar media when the pus was taken from typical

ripening, unopened abscesses or pus nodes, that such cultures were usually pure, and that the inoculation of a pure culture into the skin of the legs of normal experimental horses always produced typical leg lesions of the disease.

Some examples of more or less atypical forms of the disease are given below :—

1. Two ulcers discharging and purulent, and about 10 dried or cicatricised on off hind leg below hock. An abscess inside of off thigh. An abscess behind near shoulder. Two small abscesses near side of neck, one large and one small on off side of neck, and one abscess in the prepectoral region. Mallein reaction negative ; horse destroyed.

Post-mortem finding.—Abscess inside of off groin, another just behind sternum, and a large fistulous abscess between sternum ribs, and near fore leg. Spleen, liver and heart normal ; kidneys : multiple small abscess in both ; lungs : several small purulent foci. Pure cultures of B.P.-N. were obtained from each sample of pus collected from thigh, neck, shoulder, kidneys, and lungs. The bacillus was also noted in the pus by direct microscopical examination.

2. No "Leg lesions." First abscess appeared over point of off shoulder. It was treated surgically and was healing. A second small abscess appeared 11 days later at the back of the thigh and a third large abscess formed over point of hip. Pus from this last abscess gave a pure culture of B.P.-N. The horse rapidly became emaciated, and passed small quantities of blood in the urine.

Post-mortem findings.—Paranephritic abscesses of both kidneys and a purulent inflammation of the bladder and vagina. Pure cultures of B.P.-N. were obtained from kidney pus.

Experiment.—A normal experimental horse received an inoculation of a culture of this strain under the skin of the fetlock. An abscess formed there and ripened in 4 days. By the end of two weeks 13 lesions had developed in the infected limb, the most recent being towards the groin. Cultures of B.P.-N. were again obtained from the pus, some pure, others mixed with a staphylococcus.

3. Groups of multiple small abscesses hips and shoulders, and on facial region of head. Also one large abscess measuring 7 inches by 4 inches behind the poll. The animal was very debilitated and emaciated.

Pure cultures of B.P.-N. were obtained from the pus of the large poll abscess and from one of the small shoulder abscesses.

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From one of the facial abscesses, the B.P.-N. was obtained, together with a gram-negative streptococcus.

4. A large isolated abscess in the region of the triceps muscle, near shoulder, and another under the vulva, were followed by typical lesions of Ulcerative Cellulitis on off fore limb below the knee. Pus from large isolated abscess gave a pure culture of B.P.-N.
5. A large abscess on left side of the back and a smaller abscess on left side of chest. Pure cultures of B.P.-N.
6. A chain of small ripening buds in the prepectoral region. No other lesions. Pure cultures of B.P.-N. obtained from the pus.
7. Multiple small abscesses on neck and shoulders. Cultures of B.P.-N., also a diplococcus and a streptococcus.
8. Small abscesses on skin of abdomen. Pure cultures of B.P.-N.
9. A single abscess on the inside of thigh. No ulcers or any history of Ulcerative Cellulitis. The pus gave a pure culture of B.P.-N.
10. An abscess in the inguinal region and two nearly healed ulcers near the hind fetlock. Pure culture of B.P.-N. from inguinal abscess.
11. Purulent discharge from knee and hock following ulcerous lesions below. Cultures of B.P.-N. from knee and hock together with streptococci and staphylococci.
12. Sero-purulent discharge from a thickened hock. No other lesions on limb or body. Direct microscopical examination showed strepto and diplococci. Cultures: B.P.-D. associated with the other organisms.

The foregoing are but single examples. Similar cases have been examined by the same method and with similar results.

Treatment.—In many cases the ulcers will heal up under simple forms of antiseptic treatment. Nevertheless, the disease is prone to recur and progress, abscesses and ulcers continuing to develop. Applications of tinc. of iodine, solutions of potassium permanganate, or prolonged irrigations with normal saline solutions are all beneficial, and preferable to the use of strong caustics and astringents and the heroic measures that are sometimes employed, but a permanent cure by any such means is the exception rather than the rule. Intravenous and intramuscular injections of Lugol's solution, silver and mercurial salts have been tried with but little, if any, better success. More favourable results are being obtained by vaccine methods of treatment.

Vaccine Therapy.

The preparation of autogenous vaccines for the large number of horses admitted to the Veterinary Hospitals with Ulcerative Cellulitis is impracticable. A stock polyvalent vaccine is therefore employed.

Method of Preparation.—Pure cultures of the Preisz-Nocard bacillus are obtained on serum-agar from the pus of abscesses occurring in typical and atypical forms of the disease. These are subcultured at 24-hour intervals until a prolific growth is obtained. Large flat flasks or bottles of serum-agar are then richly sown from selected subcultures and after 24-48 hours the growths are removed in sterile normal salt solution, passed through sterile gauze to remove any small pieces of agar, and centrifugalised. The bacterial sediment is then taken up in a mixture of equal parts of alcohol and ether, or in pure acetone, in which it remains overnight. The precipitate is collected in sterile Petri dishes and placed in a drying oven heated at 400 to 450 deg. C. The mass dries into hard, brittle yellowish-brown flakes which is reduced to a very fine white powder by prolonged grinding. To make a stock vaccine, a 1 per cent. suspension of the dried bacteria is made in a sterile glycerinated carbolised saline solution (glycerine 20·0, Ac.carbol. crystals 0·25, sodium chloride 0·25 per 100 c.c. distilled water), which is added to the powder a little at a time in a sterile glass mortar and thoroughly triturated. Needless to say every detail of technique is carried out under the utmost possible sterile conditions. The stock vaccine is exposed to a steam temperature of 100 deg. C. for 2 minutes, then diluted with an equal volume of the aforementioned dilutant, making a 0·6 per cent. suspension, 1·0 c.c. of which contains 0·005 grammes of dried bacteria.

The dosage and frequency of injection has been worked out by many trials and experiments, the following system of vaccine treatment being recommended :—

A.V.C. Bacteriological Laboratory, B.E.F.

Anti-Preisz-Nocard Vaccine.

For the Treatment of Ulcerative (Lymphangitis) Cellulitis.

Vaccine treatment *commenced at the onset of the disease* will usually result in a cure within a month. The efficacy of the treatment varies in accordance with the general condition of the animal, the type, stage and duration of the disease, the co-existence of secondary infections, and such sequels as anchylosis, elephantiasis, etc., and, most important, whether the treatment is commenced early or is delayed.

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DOSAGE RECOMMENDED.

1. When the specific infection is a quite recent and local one, begin with a dose of 1·0 cc. increasing by 0·5 cc. for each subsequent dose at seven days' interval over a period of four weeks. Thus :—

1st dose	..	..	..	..	..	..	1·0 cc.
2nd dose	on the	7th	day	following	..	..	1·5 cc.
3rd	,,	,,	14th	,,	,,	..	..	2·0 cc.
4th	,,	,,	21st	,,	,,	..	..	2·5 cc.
5th	,,	,,	28th	,,	,,	..	..	3·0 cc.
								10·0 cc.

2. When the disease is well-established, chronic, or recurrent, begin with a dose of 2·0 cc. and increase as follows :—

1st dose	..	..	..	..	..	..	2·0 cc.
2nd dose	on the	7th	day	following	..	..	2·5 cc.
3rd	,,	,,	14th	,,	,,	..	..	3·0 cc.
4th	,,	,,	21st	,,	,,	..	..	3·5 cc.
5th	,,	,,	28th	,,	,,	..	..	4·0 cc.
6th	,,	,,	35th	,,	,,	..	..	5·0 cc.
								20·0 cc.

The reactions are almost entirely local—the thermal and general reactions, if any, are slight ; 12-24 hours after inoculation there will be some œdema and tenderness ; this local reaction will become less marked at the subsequent inoculation. In exceptional cases the reactions to the first and second doses may appear either too severe or too slight ; in such cases the above dosage should be governed accordingly, reducing or increasing as indicated by the local reaction.

The vaccine method of treatment is *contra-indicated* in cases of marked debility. The object of the treatment is to excite the defensive mechanism of the animal body to a specific anti-body formation, and the success of the treatment depends upon the manner in which the defensive forces respond to the attack—the artificial introduction of the bacteria and their derivatives—and put forth a counter-attack in which the bacterial elements of the disease are destroyed. But in the case of an animal whose normal defence is already greatly weakened by bad general health and a poorly nourished state, the injection of vaccine may only result in further reducing the defence or in overcoming it and aggravating the disease.

Whenever the treatment is applied to an animal in poor flesh,

the initial dose should be a smaller one and the ascent more gradual than in the dosage indicated above.

In chronic cases, or where secondary, infections, staphylococci and streptococci, are suspected, a dose of ***Polyvalent Mixed Vaccine*** may be given midway in the intervals between the inoculations of Anti-Preisz-Nocard Vaccine.

It is essential that horses be well exercised during the whole course of vaccine treatment. When lameness has disappeared and the lesions are healing, light work tends to hasten and complete recovery.

The ampoule of vaccine must be thoroughly shaken before the small end is broken off immediately before aspirating into the syringe, so that the bacterial sediment is in even suspension.

Sterilise the hypodermic syringe and needle by boiling.

Inject the requisite dose subcutaneously on the side of the neck, alternating from one side to the other, and taking all necessary precautions to ensure sterility.

The local treatment of ulcers and abscesses should consist of frequent irrigation with normal salt saline. Caustics and strong disinfectants are to be avoided during vaccine treatment.

The preliminary experiments with the vaccine method of treatment were as follows :—

Vaccination after Infection.

Two horses were inoculated under the skin of the fetlock with a virulent culture of the bacillus of Preisz-Nocard.

1. Typical ulcerous abscesses formed between fetlock and hock. Vaccine treatment was commenced on the 10th day of the disease. The 5th and last ulcer was healing well on the 30th day of disease. Vaccinations were continued for another month, the animal receiving 8 injections in 8 weeks.

The lesions healed completely. The animal has since been under observation for three months, and there has not been any recurrence of the disease.

2. Typical ulcerous abscesses formed, as in the preceding case. Vaccine treatment was commenced on the 13th day of the disease. Five injections were given over a period of 4 weeks, in which the ulcers healed completely. There was no recurrence of the disease during the following three months of observation.

Vaccination Before Infection.

1. Three injections of vaccine in 2 weeks, followed by an inoculation of a virulent culture in the 3rd week, under skin between fetlock and hock. A very small purulent node formed in 4 days and broke,

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discharging a little pus. Healing was rapid, and no secondary lesions or further progress of the disease developed.

2. Two injections of vaccine within 7 days, followed by an inoculation ot a virulent culture under skin of neck. A small abscess formed, discharged a little pus on the 4th day, and healed rapidly ; no secondary lesions or further progress of disease.

These two experiments indicate that vaccination may possibly be employed as a prophylactic with good results, but sufficient work on that line has not been done to permit of a definite conclusion..

The following table shows the summary of results of vaccine treatment in several series of cases :—

TABLE : SHOWING SUMMARY OF RESULTS OF VACCINE TREATMENT IN ULCERATIVE CELLULITIS.

	No 6 V.H		No. 19 V.H.		Ind.V.H.	Total.	Remarks.
Series	1st.	2nd.	3rd.	4th.	5th.		
Percentage cures :	73·3%	52%	60%	77%	49·1%	57·6%	
Cured ..	11	26	30	54	82	203	
Died ..	—	1	—	1	2	4	2 died of Pneumonia, 1 of Enteritis and 1 of Generalised Ulcerative Cellulitis.
Destroyed ..	4	13	—	1	42	60	For various reasons, old age, exhaustion, debility, mange, incurable lameness, elephantiasis, anchylosis, etc.
Cast ..	—	3	17	10	14	44	do. do.
Transferred..	—	—	—	—	15	15	To other hospitals on account of parasitic skin disease ; responding well to vaccination.
Remaining for Treatment	—	7	3	4	12	26	Reported to be making satisfactory progress under continued vaccine treatment.
Total ..	15	50	50	70	167	352	

RESULTS.

It is very difficult to arrive at a definite conclusion as to just what vaccination can accomplish in this disease. On the whole, it has unquestionably done much good. In many cases the results have been truly remarkable, cures being established in a comparatively

short time. On the other hand certain cases, clinically almost identical with some of the cases in which a speedy cure was effected, have responded to vaccination poorly. As a rule, the earlier in the course of the disease that vaccine treatment is commenced, the better and quicker are the results. In the very advanced chronic recurring cases, the treatment may fail entirely. Individual cases vary in results, as they do in every known form of vaccine treatment, and it is evident that we have much to learn regarding the offensive and defensive interactions of the body cells and the conditions that most favour the production of specific antibodies against a specific antigen.

The difficulties in arriving at conclusions as the result of the above system of vaccination in several large series of animals so treated have arisen in consequence of (1) absence of history and knowledge of the duration of the disease in the majority of cases; (2) the constant culling out of horses from these series after they had received only one, two, or three vaccinations, for destruction, or to be cast and sold, frequently on account of age, debility, mange, etc., as being of no further military use, and not solely on account of Ulcerative Cellulitis, from which many of the cases were recovering or had responded well to vaccination; (3) an unfortunate selection of the type of cases, some being included that had been subjected to various forms of treatment without success, and were given vaccination as a sort of forlorn hope; and (4) delay and interruptions in the course of the treatment.

The percentage of cures would have been considerably higher than that indicated in the foregoing table, namely 57·6 per cent., if many of the animals cast, destroyed, or sent to the horse abattoirs for various reasons apart from Ulcerative Cellulitis, were left out of the calculations on which the percentage is based, as they should be. It would be safe to say that at least 25 per cent. of the animals destroyed or cast responded well to vaccine treatment, and that another 25 per cent. were so far advanced in the disease that their case was hopeless from the commencement of vaccination. It will be noted that out of 352 animals treated, 203 were cured, the other 149 being accounted for as: died, 4; destroyed and cast, 104; transferred and progressing favourably under further treatment, 41. We may say, therefore, on the grounds indicated, that in 50 per cent. of these 149 animals vaccine treatment was proving successful, and by adding this 50 per cent. (*i.e.*, 75 cases) to the 203 cured, that vaccination was more or less successful in over 75 per cent., and more or less failed in less than 25 per cent. of the cases treated.

The officers who have carried out the above treatment, after a previous experience of surgical and antiseptic methods, often the most heroic, speak unhesitatingly in favour of vaccination.

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A.V.C. Bacteriological Laboratory, B.E.F.
D.V.S., B.E.F.

Herewith is a brief summary of the work of the A.V.C. Bacteriological Laboratory, dating from its installation in March, 1917, up to July 31st, 1917.

The greater part of the month of March and part of April were chiefly spent in obtaining and setting up the necessary laboratory equipment.

The investigation of Ulcerative Cellulitis was commenced in March, and has been carried on up to date ; a full report on this disease is now submitted. The nature of the disease has been thoroughly established, and considerable information gained with regard to its pathology and treatment. Especial attention has been given to vaccine methods of treatment, and a vaccine is now prepared and distributed from the laboratory which, from the reports received, affords a satisfactory method of treatment in cases where vaccination is indicated.

To meet the demands for a mixed infection vaccine, for the treatment of suppurating wounds, fistulæ, poll-evil, etc., a polyvalent mixed vaccine is prepared at the laboratory and distributed. The demand for this vaccine is constantly increasing. Up to July 31st, 6,370 doses of anti-Preisz-Nocard vaccine and 6,910 doses of polyvalent mixed vaccine had been sent out. A total of 13,280 doses.

The laboratory has not been equipped for the preparation of vaccines on a large scale. The present rate of output cannot be increased, or even maintained, without further facilities being afforded.

A REPORT ON CONTAGIOUS NECROSIS IN THE HORSE.

By Lieutenant L. E. PRICHARD,
Army Veterinary Corps.

In all I have had 43 cases of Contagious Necrosis under treatment, the first case being admitted on the 21st November, 1916, and the last case on the 19th December, 1916.

The disease has not run a regular course, but has assumed the following forms.

Form I.—This was the most frequent form, the majority of cases starting from rope galls. The horse on admission was suffering from galled heels which, for some days discharged a yellowish viscid fluid with a very fœtid odour. It resisted all applications, and within a week of admission the whole of the skin of the heel sloughed, leaving a raw, angry surface, which granulated very slowly. In three cases the slough was so extensive that the back of the *os suffraginis* was exposed. This form is well shown in illustrations 1 and 2. It is needless to say that the patients with these sloughs were dead lame.

The hind heels were usually affected, and the horses appeared to slightly lose condition.

Form II.—In two cases, without any previous wounds, the *ergot* at the back of the fetlock became moist and sloughed out, leaving a rather deep suppurating crater. Owing to their situation these ulcers were very difficult to heal, as the movements of the patient tended to keep the wounds open. Leading from these ulcers the skin over the back of the flexor tendons became under run, fissures formed, and became suppurating sores, which gradually developed into ulcers with hardened edges.

Form III.—This began as a severe thrush and soon the leg swelled up as in lymphangitis. The lymphatics became corded, and buds appeared on their course, which formed into large deep abscesses and burst. These abscesses discharged a yellowish fluid, and at first somewhat resembled epizootic lymphangitis, but the *cryptococcus* could not be found in the discharge, and once the abscess healed there was no tendency to recurrence. It really was a toxæmia, the patient being constitutionally affected, showing increased respiration, pyrexia and loss of appetite. There was evidence of great pain, the affected limb being held in the air.

Illustration No. 3 shows a typical abscess four days after bursting. That the abscesses in this form did not always follow the course of the lymphatics is shown in illustration No. 4, where they formed a complete circle round the fetlock.

In two cases horses were admitted with brushing marks. These patients on the third day each developed a single abscess in the inguinal region. Unlike those in Form I these abscesses healed rapidly with profuse granulations.

In other instances, the bulbs of the heel became affected and sloughed. Later the lateral cartilage became involved, and the case was then virtually a quittor (illustration No. 5). In still more serious cases the infection extended, the coronet became puffy, and burst at various points, resulting, in two cases, in the hoof being shed and the patient having to be destroyed.

The following is a typical case which developed symptoms of pyæmia. The patient was admitted suffering from a slight rope gall. The following morning this had a most fœtid odour, resembling seborrhœa, which could be smelt all over the stable. The horse was in great pain and continually held its leg in the air. Large beads of yellowish fluid stood out all over the heel. Within 48 hours there was a distinct line of demarcation running round the skin of the heel, and in less than two days the skin separated, leaving an angry surface. During this time the leg had swollen to three times its normal size. Then the

lymphatics became corded, and three large abscesses formed and burst in the region between the fetlock and the hock. As soon as these abscesses were evacuated, the animal was relieved and began feeding better. The case steadily improved, and was finally discharged to duty. The only blemish was a permanently enlarged leg.

Treatment.—Owing to the various forms of disease assumed it was impossible to have one fixed line of local treatment; but one line of internal treatment was carried out in all cases. On admission the patients were purged with aloes, and fed on bran until the action of this medicine had ceased. They were then given the following course:—Acidum arseniosum 8 grains, hydrargyri iodidum rubrum 5 grains, the dose being gradually increased daily, until at the end of a fortnight they were receiving acid. arsen. 15 grains, hyrdrarg. iodid. rub. 10 grains, and then the doses were gradually decreased, finally stopped for a week, and then restarted. This treatment appeared to have a marvellous effect in promoting the healing of the wounds.

The external treatment varied according to the case, but the following were the chief methods:—

(1) The cases which began as rope galls.

These were first washed in a 5 per cent. solution of zinci Chloridum, dried, and painted with tinctura iodi.

I tried various other disinfectants, Eupad and Eusol, and dry dressings of zinci oxidum, iodoformum and acidum Boricum; but I found the chloride of zinc and iodine far the best.

When abscesses formed they were syringed out with 1-1000 solution of perchloride of mercury.

(2) Cases which began as thrush.

The horn was well pared away and the frogs were treated in the ordinary way with copper sulphate or a mixture of copper and zinc sulphates. The cases which developed quittor were operated on and the lateral cartilage removed.

The cases were considered to be contagious and were carefully isolated. All standings were carefully disinfected and instruments sterilised.

I am greatly indebted to Captain G. A. Kelly, A.V.C., Divisional Veterinary Officer, 5th (Mhow) Division, for much valuable help during the early stage of this outbreak.

The average length of time the cases discharged to duty were under treatment was 49·6 days. The cases destroyed were in hospital on an average 47·2 days and comprised 14 per cent. of the admissions.

THE USE OF ARECOLINE HYDROBROMIDE IN THE TREATMENT OF COLIC.

By CAPT. C. E. W. BRYAN, *Army Veterinary Corps.*

AFTER having successfully treated upwards of about 400 cases of colic in this country in various classes of horses and mules, I cannot but recommend the most useful and efficient drug we have in arecoline hydrobromide. Before I came out to this country, I used to give ½ and 1 gr. doses and my results were not always very satisfactory. Now I always give, with few exceptions, 2 gr. doses, even to cobs and light riders. Below this dose one is apt to be dissatisfied with the results.

The only times I do not use it are in (1) very mild cases of colic; (2) cases with very weak pulse and debility; (3) cases of acute tympany; (4) cases of diarrhœa and exhaustion.

I am quite aware that there are many cases which a dose of ammonium carbonate or chloral hydrate puts right in a short time, but very often these two drugs do not give the desired effect.

In other cases something else has to be done. I never hesitate in these cases to give gr. ii arecoline hydrobromide hypodermically and ℥i ammonium carbonate, the ammonium carbonate to be given first, as the arecoline causes more pain and a lot of salivation, which renders balling difficult.

The arecoline generally begins to show its effects in from 3-10 minutes by copious salivation and increased uneasiness. Occasionally trembling of the fore legs and shoulders occurs. The salivation generally lasts about ¾ to 1½ hours; seldom more than two hours. Fæces are usually passed, at first hard, in about 20-45 minutes, becoming softer and softer until generally they are fluid.

Relief of pain generally occurs in about 1½-2 hours. I have seldom seen any alarming effects following its use. Occasionally one gets an acute attack of super-purgation lasting three-four hours. If it continues more than three hours, I give 4-6 grains of morphine, which always has the desired effect.

In cases of colic with great pain, chloral hydrate ℥i in bolus is of great help. In addition to quietening the pain, it prevents tympany, and does not appear in any way to interfere with the action of the arecoline. In cases of impaction, ammonium carbonate and strychnine gr. i is of great benefit, the latter acting as a general stimulant and increasing the action of the arecoline.

Generally one dose of arecoline is sufficient, but I have many times given a second and even a third dose. In these cases I give 1 gr. and never until three hours have elapsed without much effect from the first dose. I have begun to look upon arecoline as a valuable

prognostic agent. If it acts well and causes copious salivation, one can rest assured that the case will recover. In all cases where the animal has died the arecoline never acted well and scarcely any salivation was observed. In all cases which ended fatally, strangulation of bowel was found on *post-mortem* examination.

The advantages in arecoline are—

(1) Rapidity of action and therefore rapidity of result. If the animal has already a strangulated bowel it kills him quicker.
(2) Rapid purge.
(3) No nausea or disturbance of appetite.
(4) All effects of the drug disappear after four hours.
(5) Small bulk to carry, especially when one is on the march.

In my opinion, with arecoline, strychnine, ammonium carbonate, and chloral hydrate, all cases of colic, except those due to obstruction of the bowel by strangulation, calculi, etc., have every chance of recovery. My percentage of losses has been very small, and every fatal case on *post-mortem* examination has showed strangulated bowel.

A NIGHT TREK THROUGH THE "FLY" BELT.

By Lieutenant H. E. H.,
Army Veterinary Corps.

Monzi Hill is a conspicuous landmark in that part of Portuguese East Africa. It is a great, grey granite kopje crowned by an enormous boulder. One side of this boulder is hollowed out into a cave, in which, so I have been told, lie the bones of chiefs. It may be so, but, as I was much more interested in the fresh game spoor that existed in the native gardens at the foot of the hill, I did not trouble to investigate the truth of the statement. Besides, a daily shade temperature of 90 degs. F. or more does not incline one towards unnecessary exercise.

We were riding transport between a place in North Rhodesia and another on the Zambesi. There were two of us, a Dutch conductor and myself—that is there were only we two white men—but we had plenty of natives with us—drivers, leaders and brake-boys. The conductor was in charge of ten waggons, each drawn by a span of twenty oxen. We were carting tobacco, each waggon having a load of two to three tons. The road is about 250 miles long, and many are the natural difficulties to be overcome when journeying along it; but hills, rivers, deep sand, etc., are trifling obstacles compared with the "fly-belt" that occupies the fifty miles between the Luia and Chiritsi rivers.

Ordinarily, when travelling in fly-free country, the routine of ox-transport is somewhat as follows: During the day the oxen graze and

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rest. Towards sundown they are inspanned, and one makes an evening trek of four to six hours. Arriving at a suitable place, the waggons are drawn up four or five abreast, and the oxen are released from the yokes, but remain attached to the trek-touws. The hour for the morning inspan depends on the distance to be traversed before one arrives at a place suitable for the day's outspan, timing it so that the oxen will all be out of the yokes and grazing before the sun is hot. When negotiating a "fly-belt," however, the rules are to travel only during the darkest hours and to get through it as quickly as possible. If the belt is less than twenty miles wide, and the going is good, one can rush it in one night. If one cannot get through in that manner, one must make arrangements for guarding the cattle from tse-tse during the daylight hours. In our case there had been erected, at intervals, large, dark sheds, in which the oxen could be housed by day. At the base of Monzi Hill was one of these sheds, but between it and the next—on the Luangwa River—there were twenty miles of road, fairly level but very sandy. This long trek was necessary on account of the absence of water between the two places.

The previous night's journey had been an easy one, and the cattle were safely housed several hours before daylight. During the day the cattle were fed on dry mealie stalks that we bought from neighbouring villagers, at the rate of ten bundles, of 50 lb. each, for 1 yard of calico. The shed was as dark as is consistent with fair ventilation, and housed therein the cattle were safe from "fly." In the immediate neighbourhood of the shed the bush had been cleared, and there were very few tse-tse flies, so that it was not necessary to wait until it was quite dark before we let the cattle out to water at some pools, a few hundred yards away from the shed.

By the time the oxen had finished drinking, the sun had set, and before we had completed inspanning the last trace of daylight had disappeared; the moon was not due to rise for several hours. In order to take every precaution we did not even light a lamp, but depended entirely on the starlight for seeing the road.

Our first delay was occasioned by a tyre becoming loose, necessitating the cutting and driving in of wedges. It was a hind tyre, too, so for the rest of the trip the work of the brake-boy of that waggon was augmented, for it is very difficult to apply a brake effectively when there is a bulge in the tyre.

The deep sand made the going very heavy, so that in spite of the best efforts of the drivers the pace was only two miles an hour. Then further delay was caused by having to double-span the waggon across a bad, dry drift.

About 2 a.m. the moon rose. Our anxiety was now great. We

had come about twelve miles, and were in thick "fly," and, as is well known, tse-tse bite readily by moonlight. So far as that goes they will bite readily on dark nights if they are disturbed by an animal brushing past the herbage in which they rest; but they cannot see to fly to their prey unless it be light. The oxen were tired now, yet we dare not spare them, and we were forced to urge them with voice and whip to get greater efforts. Anxiously we wandered up and down the slowly moving spans, looking to see if any of the cattle were switching their tails—although, as we learnt later, this is no true index of whether the cattle are being bitten or not, because on this occasion we saw no switching, yet many oxen went down later with trypanosomiasis contracted now.

I have said that the distance between the two sheds was twenty miles. The last three or four, however, were practically fly-free, but before we reached this safe part morning came. I was a bit ahead of the train when the sun rose, and I was standing waiting when I heard a familiar buzz, and a tse-tse alighted on my shirt. Then another arrived, and I realised that if the oxen were receiving the same attention we were "jolly well in the soup." While so thinking, the first waggon passed me. The oxen looked played out, as well they might, seeing that they had been travelling practically continuously for eleven hours. The great-hearted ones of the span were bending gallantly to the yokes, although their breathing was stertorous, and the jugular veins stood out like ropes on their necks. The faint-hearted oxen were looking despondent, pulling only when their names were shouted or the lash fell across them. The voorlooper was shuffling along, and the driver looked ready to drop with weariness, and his voice was hoarse and cracked. I saw no flies on this span, but as I passed to the rear of the waggon one alighted on me. I had not the heart to stop with the poor, wretched oxen, so I pushed on by myself to the Luangwa River, and there I waited.

At last they arrived. One driver had practically fainted, and was riding on his waggon, but the rest were still shuffling along in their appointed places by the side of the oxen. The conductor looked haggard and was as dust-laden as it is possible for a man to be. Oh, the relief of hearing that "Wa, now!" and the pleasant grinding of the brakes. The yokes were cast off, and, regardless of stray tse-tse flies, weary oxen and wearier men plunged into the cool, still water.

THE FOREST FLY.

By THOS. B. GOODALL, F.R.C.V.S.
Christchurch.

THE name by which it is known among scientists is "*Hippobosca Equina.*" It is pupiparous, *i.e.*, instead of laying eggs as, most other

insects, the single egg is hatched and the larva developed in the body of the parent, and just before the expulsion of the pupa the abdomen of the fly is enormously distended.

Its body covering is hard and chitinous; the only way of killing it by hand is to squeeze it in the long axis of the body between the wings with the edge of the thumbnail, the lower part of the body being in the finger.

It never takes long flights, but short ones from one part of the body of the host to another; if disturbed, it usually dodges a would-be catcher by going under the abdomen, or over the back, from one side of the body to the other. Occasionally, when being "chased," it will leave the host and settle in the garments. It is as well to have a man on each side of the horse when trying to catch them.

Its real habitat in the host is on the thin skin of the perineum, or between the thighs, and in these parts it undoubtedly "sucks" blood. Its proboscis resembles somewhat that of the glopina (tstse fly). When it settles on any other part of the body it has a knack of crawling, generally side-ways, until it reaches the parts sought for, and it is when so occupied that it causes so much irritation and annoyance to horses not accustomed to them.

The feet are furnished with claws and suckers, enabling them to cling with great tenacity to the hairs of the host, and they cannot be dislodged by the swishing of the tail. An interesting demonstration of this clinging power may be made by taking one of the flies by the wings, then placing its feet in the hair on the back of the hand or on the arm, and raising the fly by the wings, it will drag the hair with it.

The only way to catch the fly is to dab the fingers quickly over it as it rests on the body, and then to draw them together, and it is secured. By any other method it eludes its would-be captor by flitting to the other side of the body.

In the New Forest in the hot months, both ponies and cattle may be seen with *swarms* of scores of the flies about the perineum, where, on removal, the marks of their "bites" may be seen by the oozing of minute droplets of blood.

FIBRO-MYOMA IN ABDOMINAL CAVITY OF RETRIEVER DOG.

By G. GAIR, M.R.C.V.S.
Conon Bridge.

THE subject, an eight-year-old retriever dog, was noticed by the attendant to be losing condition for several weeks, and the abdomen getting rapidly larger. On examining the dog, a large firm mass could be detected in the abdomen, and I concluded it was one of

those rapidly-growing tumours that had to be dealt with. The diagnosis being unfavourable, the animal was destroyed by giving a hypodermic injection of prussic acid. On *post-mortem* examination, a large rounded tumour was found weighing 13 lb. The mass was situated among the intestines and adhering thereto. On cutting into it the pink colour and cotton ball appearance of the cut surface gave the characteristic picture of a fibro-myoma. Sections from the tumour were prepared, and stained with hæmatin and eosin, and also with hæmatin and Van Giesen, the latter being a good stain for fibrous tissue. Microscopic examination showed bundles of non-striped muscle fibres running in all directions, some longitudinally, transversely, and others obliquely. The fibrous tissue is well seen between the bundles and individual fibres. It is on account of the fibrous tissue entering into the composition of the tumour that the term fibro-myoma is employed.

It is an intermediate condition between a fibroma and a myoma. Blood vessels with fairly well developed walls were seen, extensive hæmorrhages were present, and also necrosis (red softening).

This class of tumour frequently shows such changes, as well as calcareous degeneration. Two varieties of the tumour occur:

(1) Rhabdomyoma, composed of striated muscle; it is not very common and is usually congenital, and more frequently affects the kidneys in human subjects.

(2) Leiomyoma, the variety met with in this case; it differs from the former in only developing from pre-existing unstriped muscle fibre.

It occurs most commonly in the uterus (uterine-fibroid). It also occurs in stomach, intestines, œsophagus, broad ligament, and ovaries of human subjects, and has been known to weigh as much as 20 lb.

Translations.

THE METHOD OF USING ANTISEPTICS IN WAR SURGERY.

Professor Roux, dealing in *Academie des Sciences* with the question of the method of using antiseptics in the surgical clinique, expresses his ideas on the points summarised in Cazin's research, Cazin being a doctor in the Ambulance Section of the Polytechnic School who wrote in collaboration with Mmselle. Krongold. According to these authors the choice of the antiseptic to be used must depend on the genus of the microbe to be dealt with, for the microbian flora of wounds are very variable. There is no universal antiseptic, he

declares, effective in all cases. Roux insists on a definite plan, following the teaching of Cazin and Mmselle. Krongold, in the use of the most convenient antiseptics in different cases. Precise results, above all, depend on a careful examination of the microbian flora of the wound, and not on proceeding without method in the use of antiseptics.

The authors quote the exclusive action of Leclainche and Vallée's serum in the case of suppuration due to streptococci, and to the minor efficacy of the serum in the treatment of suppurations due to the anaerobes, such as perfringens or the septic vibrio accompanying anaerobic streptococci. In the treatment of infected wounds which contain flora, the bacillus pyoscyances or staphylococci predominating, associated with diverse diplococci, cocci, and other banal bacteria, the antiseptic solution of nitrate of silver of the strength of 1 in 200,000 has given the best results.—*Revista de Veterinaria Militar.*

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MAXILLARY OSTEO-SARCOMA.

By CLEMENTE MARTINEZ HERRERA,

Veterinary Surgeon to the 2nd Spanish Regiment of Mounted Artillery.

The horse "Philologist," belonging to the 5th Battery of the East Regiment, sorrel-coloured, and put aside to be cast, presented a tumour on the external left face of the inferior maxilla, 12 centimetres long and 9 centimetres broad, inserted into the inferior border of the maxilla up to ¼ centimetre from the molar arcade. The tumour had been treated by the ordinary procedure with caustics and resolvents without obtaining even minor advantage; the treatment was prolonged with a view of avoiding surgical intervention, a delicate proceeding in the anatomical region in which the neoplasm was situated. As no result was obtained, extirpation was decided on.

The horse was put on a Vinsot's table, the region was disinfected and anæsthetised locally with cocaine adrenalin, and, under the direction of Professor Coderque, an incision was made in the skin in the direction of the long axis of the tumour, and dissecting the skin on both sides until the base of the tumour could be ligatured, a strong cord was passed through the middle of the tumour and slip-knotted at both extremities which much facilitated nucleation. By its inferior face the tumour was intimately related to the external maxillary arteries and veins and to the tongue, which were perfectly isolated without ligaturing. The base of the tumour was inserted into and adherent to the maxillary bone. Stenson's duct, which wound round the inferior border of the tumour, was dissected out

with great care. At its anterior part the tumour was extirpated with ease. The edges of the wound were levelled, the superfluous skin cut away, a drainage tube inserted, and anæsthesia kept up with ethyl chloride. External protection was given to the wound by means of a Mayor's bandage.

For the subsequent nine days after operation, the cavity suppurated profusely; as an application twice daily nothing else was used but boiled water and seroform, protecting the wound with an external antiseptic, curtailing the suppuration, and the horse, which was operated on on August 11th, only had a cicatrix at the place of operation on August 28th. The extirpated tumour weighed 167 grammes, was of smooth consistency, like an apple with ossified and hard granular portions. Section through the middle showed a greyish, yellow cortex, with broken down alveoli containing opaque reddish liquid.

Microscopic examination showed a smooth and abundant ground substance distributed in zones of varied hardness, as in the cortex; also embryonic rounded and oval, voluminous and polynuclear cells in some parts in process of calcification. The tumour was an osteo-sarcoma.—*Revista de Veterinaria Militar.*

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PIROPLASMOSIS EQUINA.

By TAHUER.

Among the injuries favoured by the actual war in Europe is the propagation of various epizootics; a few had ceased to exist in some countries, others that were disowned are appearing now; among these may be noted piroplasmosis equina.

In one zone of Russia, others of Turkey and others of Italy, it had been limited to certain areas, but the necessities of war and transport of all kinds of stock has extended the malady into regions in which it was formerly only referred to as of the past. Markoff believes that the presence of piroplasmosis equina in the Balkans has risen in importance to that of Southern Russia; Kubitz accentuates the presence of the epizootic in Bulgaria; Carpano has noted the propagating in Italy of two distinct forms, due to the presence of different parasites. Up to the present we have only known (and fortunately we have only considered it as an exotic and have made no extended observation of it in our country) the form described in the text-books under the name of babesiosis or piroplasmosis equina; for this reason we will only discuss the subject without making authoritative remarks on it. Carpano has studied the malady practically, and we believe it opportune to make a note of some of his observations.

He says that the most prevalent form in the Italian peninsula is "llamada nutaliosis" due to nutalia equi; it is most benign, its mildness being related to the altitude and extent of the marshy ground where it prevails, but it is most severe in the southern region. It is transmitted by a tick, the *rhipicephalus bursa*, whose larva is infected with the blood of a horse attacked, and the adult tick becomes parasitic on the healthy horse. The clinical form develops afterwards as described subsequently, but is less grave and gradually dies away.

The other form of true piroplasmosis is transmitted by another ixode, the margaropus annulatus, which harbours the piroplasm known as babesia equi from the beginning of its existence; it is not infective as a larva, but is infected previous to transmitting the malady to a healthy animal.

Any of our horse stock may be invaded with the malady, and we advise our readers to become acquainted with the symptoms. According to Theiler (an authority on the matter) there are two forms—acute and chronic. The acute form manifests itself by fever, icteric mucosae with many reddish areas, icteric sclerotics, eyes watering, fatigue, depression, weak accentuated and venous pulse, extreme anorexia, polyuria, and great discolouration of the urine, rapid emaciation, with the emission of a disagreeable odour at any time before death, which occurs in five to nine days in all cases. The chronic form may cause death in a month or produce severe anæmia. As the parasite is harboured in the blood, this fluid must be examined for diagnosis. According to Bimbu, piroplasmosis may be combated with injections of quinine.—*Revista de Veterinaria Militar.*

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Abstracts.

COLIC IN A HEIFER.

By D. UDALL and F. KOENIG.

A 2-YEAR-OLD Guernsey heifer, two or three months pregnant, was found uneasy by the owner at 11 a.m. From this time on she continued to be more restless and finally developed evidence of severe pain.

Symptoms 3 p.m. A heifer in fine condition is found lying down, breathing rapidly, moving the hind feet about, and grunting as if in pain. Enquiry shows that no manure has been passed since morning. P. 110 to 125. T. normal. On being made to rise she kicked almost continuously with both hind feet, and carried the tail twisted and between the legs; peristalsis suppressed. On rectal examination

a hard painful mass was felt deep in the region of the right flank; on palpation through the rectum this mass was found to be very painful. It was an unmistakable case of intussusception. She was hauled to the college clinic in the afternoon, operated in the evening and eventually made a complete recovery. Before conception this animal was treated for sterility, but the intestinal disturbance had no bad effect on the fetus.

Colic in cattle may be due to a variety of causes, some of which are trivial and transient in character. Colic in cows is regarded by some as almost positive evidence of bowel displacement. While it is a prominent symptom in the early stages of some displacements it cannot be accepted as positive evidence when a rectal examination is negative. Complete suppression of the feces combined with a very rapid pulse is of more value in making a diagnosis of intussusception than the presence of colic. In most cases intussusception is easily recognised by a rectal examination.—*Cornell Veterinarian.*

CYSTITIS IN THE DOG AND CAT, AND TREATMENT.

By OSCAR SCHRECK,
New Haven, Conn.

Synonyms.—Inflammation of the bladder, catarrh of the bladder, irritable bladder, etc.

Idiopathic inflammation of the bladder is of rare occurrence. It most commonly originates either from traumatic causes or from irritation produced by irritating drugs, such as phenol, turpentine, cantharides, or of poisonous or infected matter, especially if long continued. It is an inflammation of the inner coat of the bladder, which usually spreads to the muscle, around the neck of the bladder and arises under very different circumstances.

The bladder is a musculo-membranous pouch that serves as a temporary reservoir for the urine. The bladder is situated in the pelvic cavity, where it occupies more or less space according to the quantity of urine it contains, and is formed of two membranes which compose its walls, the internal of which is mucous, and the external of which is muscular. Anteriorly, the latter is covered by the peritoneum. When the bladder is empty it is thrown into internal folds or wrinkles. The bladder is well supplied with blood vessels, lymphatics, and nerves. The odour of urine in the bladder is suggestive of ammonia. If turpentine has been given, it will be of a violet odour. The colour is yellow to dark yellow or pale when there is a greatly increased amount of urine passed. It is acid in reaction, but an alkaline reaction is generally seen in bladder diseases.

Cystitis may be acute or chronic; I have never seen a case in

the dog or cat but that the history was one of irritation produced by drugs, following accidents, and by extension (catarrh of the urethra), or from the pelvis of the kidney to the ureter and thus involving the bladder.

Inflammation from blows or automobile accidents is seen more often if the bladder is distended, less often if the organ is empty.

Symptoms.—As soon as a few drops of urine collect, they excite so much irritation of the bladder that the animal makes frequent attempts at micturition, and passes only a small amount at a time. Little by little the urine becomes thick and turbid, accompanied by tenesmus and great suffering. The fluid is generally ejected forcibly or even spasmodically. Bowels more or less constipated, loss of appetite, rise in temperature may be severe; acute cystitis commonly degenerates into the chronic form of the disease if the cause is not removed, and may be followed by incontinence of urine. In the chronic form, the appetite is generally good, but the animal is of a very irritable, touchy disposition.

Treatment.—Inflammation, or catarrh of the bladder. The treatment in most cases is very simple after the underlying cause is removed, excepting those cases that follow accidents. Drugs indicated in the treatment are, buchu oil of juniper, linseed tea, boric acid, potassii citrate and acetate, acacia, balsam of Peru, salol, myrrh, and I find that sodii phosphate is the best remedy to restore acidity to the urine. The bowels should be kept open by giving the animal oleum ricini or equal parts of ricini and buckthorn, or saline. I am in favour of the latter. Mucilaginous substances mixed with food are good, if the animal will eat. I have obtained good results from its use in this manner (flaxseed, barley water), milk, soup, broth, beef tea, all are very useful. Triticum (dog grass) is to be recommended for its emollient and diuretic action in the treatment of cystitis or irritable bladder. It is to be given in the form of an infusion if possible; hyoscyamine is to be given if there is much pain or spasm; hexamethylenamine has been used by me with the best of results; Exercise should be allowed but not overdone. Of late I have secured the most satisfactory results from the use of the following:—

℞

Potassii citratis	.. dr. II-ss
Spts. aether nitrosi ..	.. dr. IV
Formine	.. dr. I
Tr. hyoscyami	.. dr. I
Aquae menth pip ..	.. dr. I
Aquae menth pip	q.s... oz. III

M.

Sig. ½ to one dram in a little water four times a day.

If there is great irritability the following formula is useful for the atonic condition.

℞

Potassii citratis	.. ..	.. dr. V
Potassii bromidi	..	.. dr. II
Tr. hyoscyami	.. ..	.. dr. IV
Tr. belladonna	.. ..	.. dr. I
Syr. simple	.. ..	.. oz. I
Aqua distil	.. q. s.	.. oz. III

M.

Sig. One dram four times a day.

℞

Fl. Ex. tritici	.. ..	.. dr. II-ss
Tinct. belladonna	..	.. dr. ss
Sodii bicarb	.. ..	.. dr. II

M.

Sig. ½ to one teaspoonful in a little water every three or four hours.

The above are also useful in the treatment of this disease in the cat, but the dose must be reduced accordingly.—*Jnl. of A.V.M.A.*

DERMATO-MYCOSES IN CALVES.

JUAN VARAS CATALA, *San Juan, P.R.*

WHILE inspecting calves in a dairy stable, property of Felix Rodriguez, at Bayamon, Porto Rico, my curiosity was aroused by many large greyish-white scabby spots, which had attained the size of the palm of the hand, and some even larger, on the neck, face and body of twelve calves. I removed some scabs, finding underneath ulcerous indentations filled with pus. The attendant informed me that the spots had been on said animals for a long time; that all kinds of treatment was given without results, and that he had contracted the same disease, curing himself with applications of tincture of iodine.

After I got through examining carefully every sick animal I realised that in order to arrive at a definite diagnosis it was necessary to examine microscopically material obtained from the diseased part. Therefore, with a scalpel, I collected some scrapings from the different animals in test tubes which were partly filled with chloroform, and had them shaken for a little while. After the chloroform was poured off, the sediment left was mixed with a 33½ per cent. solution of sodium hydroxide; then the fluid sediment was mounted on slides, using

cover-glasses, and examined under a powerful microscope with a dry lens, finding a beautiful field of threads and spores of the *Tricoptonhy tonsurans*, which, as is known, is the cause of herpes tonsurans.

I immediately ordered the separation of the diseased calves from the healthy ones, quarantined them, and recommended the treatment of the affected part with tincture of iodine.—*Journal of American Veterinary Medical Association.*

"SAND COLIC."

Editor, Journal of the American Veterinary Medical Association,
Ithaca, N.Y.

DEAR SIR,—Among the "European Chronicles," and under the head of "Sand Colic," I note an interesting little article in your March issue.

Evidently the author has heard of the condition "Sanded," or, possibly, has rubbed up against a mild case or two; but if he should visit Florida, I think he might still find a few cases of the real thing.

A few years ago, while we still used mules and horses as a means of transportation in this part of the world, it was quite common, and I still occasionally meet the condition among cattle. In cattle, the most common point of impaction is the omasum, and this will become a solid mass of cement, which surely kills.

Out of many cases I have three good *post mortem* demonstrations: two in horses, where the impaction was in a single loop of the small intestine. In one case the mass weighed 52 lb., in the other 70 lb., and the intestine was dilated to a foot or more in diameter. The third case was in a large gray mule which the owner said had been subject to mild colics for a year or more. When she was brought to me there was no trouble with a diagnosis, and I told the owner that nothing I knew of, except a long-handled shovel, would move the mass. My prognosis was a fatal termination, and she proceeded to die during the next twenty-four hours. On *post mortem* the cecum contained something more than 100 lb. of clear white sand, packed like cement.

One feature of these cases is that the food mass will, for a long time, pass over the obstruction. I have, on one occasion, recovered an ounce aloes bolus from the rectum that had been administered per orem, a day or so previously, and had not even dissolved.

With us it is not uncommon for any of the larger animals to get a habit of licking up sand, just as they would salt; and this is done where salt is kept constantly before them. In thirteen years' practice I have found only one successful method of treatment, and that is, prophylactic. A pound of whole flaxseed fed once each week to a

horse, mule or cow, and the owner can forget about "sand." In my experience, high and copious irrigation against such a mass as sand impaction forms is more than apt to result in a ruptured intestine, and I have found it better practice to let the animal die, if it has to, than to let the owner see you kill it trying to save.

FRED W. PORTER, D.V.M., Tampa, Fla.

Reviews.

EPIZOOTICS AND THEIR CONTROL DURING WAR. A GUIDE FOR ARMY, GOVERNMENT AND PRACTISING VETERINARIANS. By Dr. Herman Miessuer, Hanover. Pp. 207; 37 illustrations. Translated by A. A. Leibold, D.V.M., Bacteriologist, Research Department, The Abbott Laboratories, Chicago. Veterinary Medicine Series, No. 15. Published by A.V.M. Publishing Co., Chicago.

This small book, the 15th number of the Veterinary Medicine Series brought out by Dr. D. M. Campbell, of the A.J.V.M., is a translation just published in order to be available for the veterinarians enlisted, and about to enlist, in the American Army. The text deals chiefly with equine diseases ocurring in transport circles, but also touches on two diseases met with almost solely in cattle, viz., rinderpest and contagious pleuro-pneumonia. An appendix to the little volume deals concisely with the experiences of some American veterinarians who have been connected directly or indirectly with the handling of horses in the present world war. The book is divided into two parts. Part I deals with Horse Hospitals and Horse Depots, Blood Examination Stations, and Disinfection. Part II includes sections on Glanders, Anthrax, Rabies, Mange, Contagious Pleuro-Pneumonia of Horses, Catarrhal Influenza, Strangles, Dourine, Contagious Pleuro-Pneumonia of Cattle, and Rinderpest. The list of epizootics that may arise and have occurred in the present war does not seem to be by any means complete, but those discussed are fully dealt with. The contagious pleuro-pneumonia of horses is really the pectoral form of influenza as known on the Continent, but British clinicians have seen a sporadic pneumonia, occurring mostly in heavy horses, which causes great and quick losses, and which is not mentioned in this book. At any rate, the symptoms of this pneumonia are not those given as occurring in pectoral influenza. For this complaint the intravenous injection of salvarsan holds first place. Stress is laid on the marked symptoms of colic in cases of anthrax. The latest treatment of mange by SO_2 gas seems to easily beat the remedies by washing with green soap or 10 per cent. carbol-glycerin and subsequent application of anti-mange liniments as in this book. It is recommended to treat strangles with a powder composed of antimony sulphurate, ammonchlorate, sodium sulphate and powdered liquorice root, given three times daily in the food. The chapters on contagious pneumonia and rinderpest are very useful ones. These diseases have often appeared in past wars, and the purchase by the Russians of animals from Mongolia and Manchuria makes danger from these sources obvious. The American experiences in the handling of horses for use in war deal

with the matter as connected with concentration camps or remount depots, and during transportation to the scenes of action. These pages are quite instructive. The little volume should be helpful to Army veterinarians, and useful to those engaged in preventing the introduction of disease into their own countries. As a result of British, French, Italian and American experience, however, we hope to see a much more comprehensive and equally concise work produced in the future, and advances noted all along the line in preventive and therapeutic measures. G. M.

VETERINARY REVIEW. Editor: O. Charnock Bradley, M.D., D.Sc., M.R.C.V.S., Principal of the Royal (Dick) Veterinary College, Edinburgh. Issued quarterly; annual subscription, including postage, 10s. 6d. Publishers: W. Green & Son, Ltd., London and Edinburgh.

In an opening article with the significant title of "Cui Bono?" a writer under a nom-de-plume impresses on his readers the importance of science in the material and intellectual advancement of mankind. The contribution is a very apt and useful one at the present time. It is a thoughtful and well-written piece of work. Mr. Frank Chambers, A.V.C., F.R.C.V.S., discourses on "The Transmission of Animal Trypanosomiasis by Blood-sucking Flies other than Glossina."

The "Abstracts" section is very full, complete, and interesting, and touches on such important subjects as "Bacterial Necrosis," "Infectious Stomatitis," "Epizootic Lymphangitis," "Calf-feeding Experiments," "Physiological, Surgical and Parasitology Questions." The most recent thought and investigation on a wide variety of subjects is here summarised. There are nine reviews of recently published books which all appeal more or less to the veterinarian or agriculturist.

The "Notes" on Books is a very useful compilation, and forty-two pages of "Bibliography" indicate that material for this section is pretty extensively overhauled and noted.

The REVIEW is doing good work and ought to bring home to the veterinarian the necessity of keeping busy as a reader if he wants to keep abreast of the best thought on the many subjects connected with his profession. G. M.

BOARD OF AGRICULTURE AND FISHERIES: ANNUAL REPORT OF THE CHIEF VETERINARY OFFICER FOR THE YEAR 1916. Published by H.M. Stationery Office at Imperial House, Kingsway, London, W.C.2, and 28, Abingdon Street, London, S.W.1; 37, Peter Street, Manchester; 23, Forth Street, Edinburgh, etc. Price 2d. net.

The scope of this Report has been reduced owing to war-time exigencies, but it is especially noteworthy because it deals rather fully with the treatment of swine fever by means of serum. There was only one outbreak of foot-and-mouth disease; this occurred in Somerset, and was soon got under control. The Swine Fever work and observations cover a period of twelve months, from September,

1915, to September, 1916. The acceptance of treatment by serum is at the option of the owner, and under it healthy pigs may be moved off infected premises for immediate slaughter, and other pigs usually treated with serum may be moved on for fattening purposes. It is gratifying to observe that the proportion of suitable cases in which serum treatment was accepted was 83 per cent., and during the twelve months serum treatment was applied in 2,100 outbreaks in which 77,900 pigs were involved. The total death-rate in these pigs amounted to 34·6 per cent. In outbreaks in which the serum treatment was not adopted, and in which 38,229 pigs were involved, the death-rate was 52 per cent. There was thus a benefit of 17·4 per cent. in favour of the treated pigs. Serum treatment being preventive and not curative, successful results depend on its early adoption before infection has spread. There is a diminished death-rate in suckers treated soon after birth, but the problem of their regular inoculation is a difficult one. Serum treatment has, however, taken all round, achieved very considerably better results at less cost than other methods previously tried.

Vaccination promises some advantage over serum treatment alone. By it the operator would act ahead of infection instead of following behind it. Pigs might thus be rendered swine-fever-proof for longer periods, but at present investigation in this direction needs carrying further in order that a suitable and safe method may be evolved.

Glanders shows a decrease of four outbreaks over last year. In Staffordshire there was an increase of seven outbreaks.

Five hundred and sixty outbreaks of anthrax were confirmed, and the animals affected comprised cattle, pigs, horse, sheep, ferrets, and one dog and one cat. The bleeding of animals and opening of carcases were more prevalent than in previous years owing to owners' desire to save carcases and use the meat, and as a result six human beings handling carcases were affected, and the dragging of an affected carcase across one homestead led to the deaths of a horse, a goat, and four calves.

Sheep scab showed a considerable increase. Six-hundred and sixty-four tuberculous pigs were met with during swine fever operations, and 4,133 pigs were found to be suffering from swine erysipelas; 461,665 cc. of swine fever serum was manufactured at the Board's laboratory, and 991,000 cc. purchased from abroad, and 8,309 doses of anti-abortion vaccine were issued for trial as preventive inoculation.

Notice.

COLLOSOLS.

We have received three samples of colloidal preparations from the Crookes Laboratories, 50, Elgin Crescent, London, W.

Colsorlene contains silver in colloidal solution, and is very useful in cases of eczema, cracked heels, canker in the ears of dogs, and wounds.

Colsorlene ***Paste*** may be heated and painted on wounds where there is danger of soiling or infection, and a bandage is not applicable. In

wounds of the coronet and bulbs of the heel, etc., we have found it useful and healing.

Colsorlene Sulphur contains sulphur in solution, and may be given internally or used externally. The sulphur is in stable solution, and does not separate out. In this form it does not seem to upset digestion, and may be well used in canine practice. We have used it successfully in eczema and erythema of pet dogs.

Obituary.

WILLIAM C. BARLING, M.R.C.V.S.

MR. BARLING died recently at the age of 68. He graduated in 1868, and was a well-known veterinary surgeon, resident at the Paddocks, Newnham, Gloucester, where he had been in practice for nearly fifty years, following his father. He was a keen hunting man and splendid horseman, and rode regularly with the Berkeley hounds. He was the veterinary attendant for Berkeley Castle and the estate. Besides his English clients, Mr. Barling for thirty years held an appointment under the Dutch Government to examine and help to purchase all the horses for their Army. He was exceedingly successful in keeping up the standard of the horses, so much so that a few years ago he was commanded to attend Court at The Hague, and was presented to the Prince Consort and thanked for his services. Since September, 1915, Mr. Barling had been in very indifferent health, the loss of his only son in Flanders the previous March being a great blow to him.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone : Gerrard 4646. Telegrams : " Baillière-Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

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Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

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Annual Subscription for the British Empire, 12s., post free ; for the United States $3.00 ; or combined subscription with the " Veterinary News " (weekly), 25s., post free. Owing to increased cost of production the " Veterinary News " has been from July increased to 3d. per copy ; annual subscription, post free, 15s. inland and abroad.